UPDATED INFORMATIVE DIGEST

Adoption of Emission Standards and Test Procedures for New 2003 and Later Spark-Ignition Inboard and Sterndrive Marine Engines

Sections Affected: Amendment to the following sections of title 13, California Code of Regulations and the documents incorporated by reference therein: Chapter 2, Enforcement of Vehicle Emission Standards and Surveillance Testing; Article 2.1, Procedures for In-Use Vehicle Voluntary and Influenced Recalls; sections 2111 and 2112; Chapter 2, Enforcement of Vehicle Emission Standards and Surveillance Testing; Article 2.3, In-Use Vehicle Enforcement Test Procedures; section 2139 and 2140; Chapter 9, Off-Road Vehicles and Engines Pollution Control Devices; Article 4.7, Spark-Ignition Marine Engines; sections 2440-2446; and the incorporated "California Exhaust Emission Standards and Test Procedures for 2001 Model Year and Later Spark-Ignition Marine Engines;" and the adoption of Chapter 9, Off-Road Vehicles and Engines Pollution Control Devices; Article 4.7, Spark-Ignition Marine Engines; section 2444.2.

Background: The California Clean Air Act, as codified in the Health and Safety Code sections 43013 and 43018, specifically mandated ARB to regulate off-road mobile sources of emissions. Included are marine vessels, locomotives, utility engines, off-road motorcycles, and off-highway vehicles. In 1998, the Board approved regulations to control emissions from spark-ignition personal watercraft and outboard marine engines. For these types of engines, the regulations became effective with the 2001 model year. The amendments adopted herein reduce hydrocarbon (HC) emissions and oxides of nitrogen (NO_x) emissions from spark-ignition inboard and sterndrive marine engines, effective with the 2003 model year.

In crafting this regulation, ARB staff met with engine manufacturers and other interested parties in numerous individual and group meetings, including trips to marine engine manufacturing facilities, as well as conference calls. The staff also held a public workshop on September 19, 2000.

The Amendments: The regulation applies to spark-ignition inboard and sterndrive marine engines. Specifically, California's spark-ignition marine engine regulations have been amended to include inboard and sterndrive engines. Thus, these engines are now subject to exhaust emission standards, certification test procedures, on-board diagnostic systems, compliance provisions, consumer provisions such as environmental labeling, and warranty requirements.

The adopted exhaust emission standards are shown below in Table 1. The standards commence with the 2003 model year, followed by more stringent levels that are phased-in beginning in 2007.

Table 1.

Inboard and Sterndrive Exhaust Emission Standards	
Model Year	$HC+NO_x$ (grams/kilowatt-hour)
2003-2008	16.0(1)
2007(2)	5.0

(1) Sales-weighted corporate average, through 2008 model year.

(2) Phased-in standard, reaching 100% compliance with the 2009 model year.

Beginning with the 2003 model year, inboard and sterndrive marine engines must show compliance with the 16.0 grams per kilowatt-hour $HC+NO_x$ standard. This standard will keep inboard and sterndrive marine engine exhaust emissions at or below existing levels. Because this standard is based on a corporate average methodology for demonstrating compliance, it provides manufacturers flexibility to comply with the regulations. Additionally, crankcase emissions will no longer be vented into the ambient atmosphere.

With the 2007 model year, manufacturers must comply with the catalyst-based 5 grams per kilowatt-hour $HC+NO_x$ standard. These standards are expected to require three-way catalyst, closed-loop technology to comply with the more stringent $HC+NO_x$ standards. Specifically, for each engine manufacturer's California production, at least 45 percent of the engines in 2007, 75 percent in 2008, and 100 percent in 2009 and beyond must comply with the 5 grams per kilowatt-hour $HC+NO_x$ standard. The phase-in provides industry with flexibility to develop these engines over a period of years.

Inboard and sterndrive engines rated over 373 kilowatts (500 horsepower) are exempted from the standards until 2009. Thus by 2009, all new engines produced for sale in California and not manufactured exclusively for competition would be subject to the more stringent exhaust emission standards.

The 2007 and later model year engines complying with the catalyst-based 5 grams per kilowatt-hour HC+NO_x standard will be required to incorporate a computer-controlled on-board diagnostic system. This type of system monitors the engine, identifies emission-related malfunctions, and stores retrievable data related to the malfunction (in the form of a diagnostic trouble code(s)) in the computer's memory so that the malfunctions can be corrected. In the event of a malfunction, the system will emit either an audio or visual alert.

Initially, the 2003-2008 model year inboard and sterndrive engines would be required to provide a two-year emissions defects warranty to the ultimate purchaser. By 2009, the engines would be warranted for three years. This warranty ensures that emission-related parts are free of defects.

Compliance of production engines subject to this rulemaking shall be determined using selective enforcement audit (SEA) testing. Procedurally, this program is identical to that used by the United States Environmental Protection Agency (U.S. EPA) and, as the name implies, would be used when the Executive Officer has reason to believe that the emissions of the engines being produced during the production run may exceed the standards.

To ensure that 2009 and later model year engines are meeting the emission standards throughout their 480-hour/10-year compliance period, ARB's traditional in-use testing program shall be implemented. For any engine family selected for testing under this program, exhaust emission testing would be performed on an appropriate sample of in-use engines. Should an engine family exceed the applicable HC+NO_x standard on average, the manufacturer shall be subject to recall provisions to remedy the noncompliance.

Manufacturers of inboard and sterndrive engines shall participate in the engine and environmental labeling programs for marine engines. The engine label identifies the engine as compliant with California regulations and may be used for enforcement purposes. The environmental labeling program denotes the relative level of emissions emitted by the engine. Currently, for personal watercraft and outboard marine engines, there are three tiers that represent graduated levels of reduced emissions. The amendments add a fourth tier, which is appropriate for inboard and sterndrive engines certified to 2007 catalyst-based exhaust emission standards. Upon demonstration of compliance to the applicable emission standard, 2003 and later model year inboards and sterndrives shall display the corresponding emission label.

Economic and Fiscal Impact: The ARB staff evaluated the potential economic impacts of the amendments on private persons, businesses and government. The amendments do not have a significant statewide adverse economic impact directly affecting businesses, including the ability of California businesses to compete with businesses in other states. Neither do the amendments affect the

creation or elimination of jobs, the creation of new businesses or elimination of existing businesses, nor the expansion of businesses currently doing business within California. However, there may be a slight increase in enforcement/certification resources needed in the state government to ensure the standards are being met over the durability test period of these engines.

Consideration of Alternatives: Other alternatives considered by ARB staff but not selected included: 1) Waiting for U.S. EPA to adopt regulations; 2) Not developing a regulatory proposal; and 3) Requiring lean fuel calibrations for engines not meeting the catalyst-based standards.

ARB staff worked closely with U.S. EPA staff on a coordinated rulemaking process. ARB's intent was to develop a regulation that is harmonized in terms of emission standards, applicability, and timing with the anticipated federal rule. Because the State's rulemaking process was on a faster track than U.S. EPA's was, and because of the urgency to obtain reductions in HC and NO_x emissions, ARB proceeded with these amendments. Otherwise, the alternative would have been to allow the federal rule to be implemented in California at a later date and not adopt a specific state regulation.

The advantage of a national regulation is harmonization. Manufacturers would have to comply with only one set of regulations for all nationwide sales. The U.S. EPA has indicated it will strive to harmonize with the standards adopted by the Board, although the implementation date shall be somewhat delayed.

The disadvantage of relying on the federal rulemaking is largely one of uncertainty and timing because U.S. EPA has yet to publish a proposed rulemaking for these types of engines. Because of lead-time requirements, it is possible that nationwide implementation may be delayed compared to the dates the Board has adopted. This delay would result in less emission reductions, compared to adoption of the ARB staff proposal. Therefore, staff rejected this alternative.

A second alternative would be not developing a regulation for inboard and sterndrive engines. However, if no emission control regulation were pursued, the emission reductions needed to meet clean-air standards would not be achieved nor would the ARB's SIP obligation be met. Staff also rejected this alternative.

The third alternative ARB staff considered involved an emission control scenario under which manufacturers would have implemented leaner air-fuel mixture calibrations on their engines in order to achieve lower HC emissions. Also under this scenario, only small numbers (10% of California sales) of catalyst-controlled engines would have been subject to the strict 5.0 g/kW-hr standards in 2007 and 2008. Staff considered this approach in an attempt to achieve early HC emission benefits, as required by the SIP Settlement Agreement. However, the proposed

enleanment of the air-fuel ratio would actually cause an increase in HC+NO_x emissions during 2003 to 2008, based on recently obtained test data showing that NO_x would have increased at a disproportionately faster rate than the HC emissions would have decreased. This alternative was rejected on this basis.

Comparison to Federal Regulations: In 1996, U.S. EPA adopted exhaust emission standards for personal watercraft and outboard marine engines. Although U.S. EPA has recently issued an Advance Notice of Proposed Rulemaking that seeks to include inboard and sterndrive marine engines, there currently are no federal regulations for these classes of engines.